Tucker (W. G.)

THE

INTRODUCTORY ADDRESS

OF THE

FIFTH LECTURE COURSE

AT THE

Albany College of Pharmacy,

DELIVERED OCTOBER 5, 1885,

BY

WILLIS G. TUCKER, M.D.,

Professor of Chemistry.

PUBLISHED BY THE CLASS.

ALBANY, N. Y.
BURDICK & TAYLOR, PRINTERS,
PUBLISHERS OF "ALBANY MEDICAL ANNALS."
1885.

Compliments of

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CORRESPONDENCE.

ALBANY, N. Y., *October* 14, 1885.

Prof. WILLIS G. TUCKER :

Dear Sir—At a meeting of the senior class of the Albany College of Pharmacy it was unanimously voted to appoint a committee for the purpose of conferring with you in regard to obtaining the manuscript of the opening address delivered by yourself for publication. Believing it will be for the good of the college, we trust your reply will be favorable.

Sincerely yours,

H. M. SWEET,
CHARLES N. GILBERT,
JOHN COVENTRY,
O. M. MYERS,
Committee.

ALBANY COLLEGE OF PHARMACY,
ALBANY, N. Y., *October* 19, 1885.

Gentlemen—Agreeably to the request contained in your note of the 14th inst., I take pleasure in handing you the address delivered at the opening of the fifth lecture course. I beg to thank the members of your class for the compliment which the request implies, and am

Yours very truly,

WILLIS G. TUCKER.

To Messrs. H. M. SWEET, C. N. GILBERT, J. COVENTRY and O. M. MYERS,
Committee.

ADDRESS.

GENTLEMEN:

The Albany College of Pharmacy opens its doors to-night, and with this evening enters upon its fifth lecture course. Looking back to that evening which seems not far away when we gathered here at the opening of our first session, we well recall the feelings of anxious anticipation which were inseparably connected with the occasion, and now, as we review the past and what has been already accomplished, and look forward to what, we trust, may hereafter be attained, it is with feelings of more than ordinary satisfaction and pleasure that we bid you welcome this evening, assuring you that no effort on our part shall be lacking to retain the confidence which you have reposed in us. Ever remember that you and the college are one—that your interests are our interests, and that the success of the school and the well-being of each can best be secured by a hearty coöperation. If you need counsel as to your work here, advice in any emergency, or assistance of any kind that we can give, we hope that you will ever feel that in coming to us you are seeking those who sympathize with you in every earnest endeavor you put forth to succeed in the work you have undertaken, and on our part we shall feel that in advising you and in directing your efforts you will believe that we are actuated only by the desire to serve you so far as we may and to the best of our abilities.

On such occasions as this it is quite customary to bring forward some topic of a scientific nature for consideration; but, without questioning the propriety of such a course, I do not propose to adopt it this evening. Labored discussions, or speculations upon unsettled problems, are too frequently devoid of practical interest and real value, and as the didactic lectures begin with to-morrow night, after which time there will be little opportunity for desultory discourse, I am going to take advantage of this occasion to give you some general hints and off-hand advice on a variety of subjects perhaps not very closely connected. I

beg therefore that you will pardon the fragmentary nature of what I have to offer, remembering that with so small a faculty the privilege of addressing the class at the beginning of the session recurs so frequently that elaborate addresses, if iudulged in, would probably consist in a mere ringing of the changes on the familiar bells whose last peal had scarce left off sounding on the air.

And first let me say something of courses of study and their object. The thoughtful man as he surveys the vast fields of knowledge which have been so profitably cultivated for centuries by the wisest of men, and views the abundant fruits gathered for our use from these well-tilled fields and stored in overflowing granaries, our great libraries or smaller collections of books, may well feel discouraged at the thought of how much is known and how little he can learn; but if he have within him the spirit of the true scholar, he will not be discouraged nor shrink from the task of appropriating—making really his own—those things which it is needful for him to know. And just here lies the whole gist of the matter. Having mastered those fundamental subjects which are essential aids in the acquisition of any higher or special branches of knowledge, the student should inquire what are the particular things which it is profitable for him to know, for these ought chiefly to concern him, and if they be followed aright their pursuit will lead him to the study of related subjects and prevent his confining himself to too narrow a range. The objection to the old-time courses of study in our colleges, like the the objection to most set courses of reading is that they assume a knowledge of certain subjects to be essential to all persons desirous of obtaining an education. Doubtless a knowledge of some subjects is, and these we may denominate elementary, though we do not mean primary alone; but with the widening of the field and the constant enlargement of the horizon, we hold that the courses of instruction in different departments of study should begin to diverge at a point nearer the beginnings of knowledge, and that often much time is wasted in the acquisition of things which have no bearing upon the life work of the individual. And this fact, for I will assume it to be such, is coming to be recognized by instructors more and more, and the general adoption of better educational systems is chiefly hindered by a too conservative clinging to certain antiquated notions as to what *ought* to constitute an education. The study of dead languages, for instance, which is doubtless neces-

sary to open to us great mines of wealth in certain directions, is not essential to those who expect to dig for treasures of another kind. Emerson, though a good classical scholar, preferred always to read translations of the Greek and Latin authors, and one must devote a life-time almost to the study of these languages to be able to read them critically or even profitably. We hear much nonsense talked about the satisfaction to be derived from reading the original texts by those who possess the usual smattering only of these languages, and all this on the part of such is sheer affectation. In one sense, of course, all knowledge is valuable, but this value is relative; and since but a comparatively small amount of the sum total can be acquired by any one person, each student should seek that which he is by nature best fitted to acquire, and which will be of most real service to him. Knowledge is but a means to an end, else would a learned man be no better than a cyclopædia. To be learned is not necessarily to be educated in the truest sense, and to be educated does not of necessity make life valuable to one's self or to the world. A man may be a miser though poor in this world's goods, for of what value is the most profound knowledge if it be not used aright—if it be not put out to usury, that it may increase the intellectual or material wealth of the world. If we but absorb that which others also know—if we add nothing, give out nothing, and turn our knowledge to no practical ends, we are but cumberers of the ground, and the world is no better that we have lived in it. I will not waste words with those who prate of the value of knowledge for its own sake, for I take it with Matthew Arnold that conduct is three-fourths of life, and that however pleasing and self-complacent may be the feelings of those who are ever gathering, but never using or dispensing knowledge, they are as parsimonious with their intellectual wealth as is the miser with the gold which he values for itself alone, and never for the good that it may do. We are to live not to ourselves only, but to benefit our fellows, and the recluse whose life is passed in the seclusion of his study may dream dreams and experience emotions, but these are valueless in proportion to the poverty of the results which they bring forth.

Now, the three chief directions in which knowledge may be made valuable have been indicated in what has been said. They are, first, research, or the using of old facts in the acquisition of new ones; second, instruction, or the communication of that which has been acquired to others; and, third, its practical

application to the varied occupations of life. Let us briefly consider each of these.

Original research is one of the noblest pursuits in which man may engage. To add to the world's knowledge by the discovery of new truths requires the exercise of the finest powers. The investigator must be acquainted with the known to the furthest confines in the direction his researches take, and must be trained to habits of observation and experimental demonstration when this method of proof can be applied. He must possess a mind capable of concentration and the exercise of the reasoning powers; be trained to trace effects to causes; to connect apparently unrelated facts; to establish logical deductions, and to avoid hasty generalizations. Galileo and Kepler, Newton and Humboldt, Lavoisier and Davy, have possessed these qualities, and the discoveries made by them mark great epochs in the history of the development of the physical sciences—have established some of them. And time would fail to tell of others, their equals, and hundreds of lesser lights and living workers who are as earnest in their search for truth, in their study of nature, as were these intellectual giants. Let no one underrate their efforts or count the success by the money value of their discoveries, for there is no fact so insignificant but it may be a link in some great chain and be all-important in some connection yet unseen. "Science," says Plato in the Republic, "has for its province to know the nature of the existent." What could be broader, simpler! And in response to an inquiry by Glaucon as to whom he calls genuine philosophers he replies, "those who love to see truth." Is any aspiration nobler! Then let us honor those men, who, careless often of material comforts, devote their lives to a study of nature and the solving of her mysteries. Such men may be brought before the inquisition like Galileo, or be upbraided, ridiculed and condemned like Darwin; for, though of them the world was not worthy, assuredly they shall have their reward, and their works shall follow them. To him who reads aright the history of the development of science nothing can be more disheartening than the modern spirit of scepticism which constantly inquires as to the practical utility and real value of scientific discoveries. Such a spirit was pardonable, perhaps—at least was not unnatural—three or four centuries ago, but it is excusable no longer; and it is greatly to be regretted that in our own country the general and state governments do not, to a greater degree, encourage and promote scientific

research, for there is much work so extensive in its scope and so costly to prosecute that without state aid it can scarcely be undertaken. Our own national government has, it is true, through its different scientific bureaus, surveys and commissions, accomplished much in various directions; but too frequently such work has been interrupted by political interference, and the efficiency of these bureaus seriously impaired; and, while some of the states have made ample appropriations for the furtherance of scientific investigations, politics have too frequently been mixed in with science, to the serious detriment of the latter.

Now, concerning the relations of educational methods to the advancement of knowledge, we have not time particularly to speak; and, indeed, if we consider the education of the masses, the question need scarcely be discussed, for the number of those who devote themselves to original research is exceedingly small. Given the mind and the ambition, and abundant opportunities exist for the aspirant to secure the training necessary to the work. Incentives even are offered to ambitious workers, and there are constantly widening fields waiting to be tilled, and capable of yielding abundant harvests; but he who aspires to work in these must early begin and tirelessly strive, for no ordinary attainments will suffice, and extraordinary exertions only will receive the reward.

Instruction we cited as the second direction in which knowledge may be made valuable. The conscientious teacher occupies a less exalted place than the original investigator, but he is, nevertheless, or should be, much more than a mere retailer of information. The less mechanical he is, the better teacher he is. Merely to absorb ideas as a sponge takes up water, and squeeze them out upon one's pupils, careless of how much sticks or how much runs off, is not to teach. There are few sights more distressing to witness than the teacher who knows no more of his subject than he strives to impart to his pupils, and whose labors are of necessity mechanical, perfunctory and method-lacking. The true teacher should know all around his subject—it should be transparent to him as glass, so that he may view it on all sides and so present it to his pupils that they will perceive a method in their work and the development of a plan as they pursue their course. His mind must be abundantly stored with facts for the illustration and elucidation of his subject, and, while he must know much more than he expects to teach, he must not confound his pupils by a display of his superior wisdom,

but must make use of his greater knowledge to place before them in the clearest light the salient points relating to their work, and to show them how the lesser facts are related to these. Thus will he save them much useless labor by ordering their work aright, and teaching them to discriminate between the essential facts and the less important particulars. He will teach them what to learn and where to look hereafter for that which needs not to be learned at present. The difference between routine teaching and philosophical instruction, therefore, is vast, the latter requiring not only a broad knowledge of the matter taught, but an acquaintance with many subjects more or less closely related thereto. No single language can be taught well without a knowledge of some others of common origin, and no one of the natural sciences can be taught properly by one ignorant of other branches related to it, any more than history could be taught without a knowledge of geography, or rhetoric by one not versed in literature. Much, then, is required of the teacher, and above all must he grow with his subject, for in these days of rapid advance he who stands still will soon be left behind, and the instructor who wakes up some day to find that his pupils lead him in the race is in a sorry predicament indeed.

As the third direction in which knowledge may be rendered valuable we instanced its practical application to the every-day affairs of life, and, though last named, I think you will agree with me that in many respects it is the most important. What would a general be without an army or a government without subjects! The commander of a nation's forces or the ruler of a great people gets the glory, but it is the people who make the history. And so the work of the world to-day is done not by discoverers and investigators, not by scholars and instructors, but by the great rank and file of workaday men—men often neither original, brilliant nor profound. The number of those great geniuses who add to the world's knowledge, who originate ideas, create philosophies, or produce lasting works in literature or art, is small, as is also the number of those modern Gamaliels who so teach as to make much impress through their pupils upon their times. The great majority of active workers in the world to-day use the knowledge they have acquired for the obtaining of a livelihood, which is true alike in the learned professions and in the business world, and when what has been said concerning the value of original research and the nobility of the teacher's calling is considered, I am sure that this statement will not

be misunderstood; and if it be so, then a most important question with instructors should be how they may best educate their pupils that they may succeed in the practical affairs of life. Opportunities always exist for the exceptionally able ones to perfect themselves in those branches of learning which the average pupil has no need to pursue, and we repeat that it is a fundamental error to suppose that all pupils in our schools and colleges need to be instructed in branches which bear so little upon the work of life as to be capable of rendering them no real service, if, indeed, they do not work them an injury by diverting their minds from a more thorough study of those subjects which are essential. I believe that the ordinary academic course is not well adapted to the wants of the majority of those who pursue it, and that our higher institutions of learning should provide a greater number of courses in the different departments, and each with some especial end in view. The establishment of technical schools for the instruction of artisans is a step in the right direction, and of late many of our colleges have materially modified the old-time curriculum. We hear much high-flown talk about the desirability of a liberal education, but it is well to remember that a man ought to know best those things which pertain to his calling. Not to know these is a reproach to him, but he need never be ashamed to confess that there are wide fields of knowledge lying outside his province which he has not explored. A mere smattering of these things will be of no real service to him and give him no claim to distinction. The whole tendency in these days is, and from the very nature of things must be, toward specialties in business and in the professions, and practical men know full well that when exact knowledge is wanted they must look to specialists for it. Spite of all said to the contrary, no one esteems a naturalist the less because he knows no Hebrew, or a financier because he knows little of science. It would be well if these facts were better appreciated by those into whose hands we commit the training of our youth.

Now, all this applies very expressly to you and to the direction which your studies should take. Let us hope that you have come here with a well-settled purpose and agreeably to an inclination long felt, and that your preliminary studies have been directed with a view to your present pursuits. If so, devote yourselves assiduously to those things which concern you as pharmacists. They are chiefly embraced in the curriculum of such schools as this, though the course of study is by no means

so extened and so thorough as we trust in time our schools will adopt; and there are few among you, probably, who will not find that individual needs necessitate the study of certain subjects, elementary in their nature, very possibly, which are not included in the course marked out for you here. Study such subjects so far as may be necessary for you to pursue matters related to them with advantage. Strive clearly to ascertain what things your business requires you to know, and learn as much of these as your time and abilities will permit. Do not allow outside matters to take your attention off from the weightier, the really essential, subjects. For you to know some Latin is well, or French and German, but you have not come here to study languages, and they are not as important to you at this time as other things; so let them alone and avoid having too many irons in the fire. Give your time and attention to essentials first and take up the non-essentials afterward. In thus advising you we at the outset assumed that you are here with a well-settled purpose, and, if so, providing you will persevere, you have every reason to look for success; but if the last few years have been listlessly spent, with no special aim in view—if you have tried this thing and that and now taken up a new subject, attracted by its novelty, you have no right to expect to succeed. But, having a fixed purpose, if you are persevering and honest, in the broadest sense, you *ought* to reach the goal you have set, and leave behind you in the race many contestants who may be more brilliant, showy or versatile, but who are less persevering than you. It is the staying qualities that in most cases insure success.

And now, after these general considerations, a few words of more particular advice. Concerning lectures, we advise you to attend all, if practicable, and especially should the juniors attend those delivered to the senior class. Take careful notes of the lectures, particularly of those to your own class, and use these in your study, for we assume that you will devote as much time as you can each day to thoughtful study. In taking notes make no attempt at word-for-word reporting, but get down the outline, the frame-work, of the lecture, with the principal definitions, formulæ and experimental demonstrations. Waste no time in copying these notes, but go to your books with them, following up each subject and mastering it so far as you can. Have pencil and paper at hand and calculate problems which have been under discussion, write out your equations, and carefully study and practice all the details of prescription writing,

and the like. Take down from the shelves specimens of any substance that you may be studying, and no matter how familiar you may deem it to be, examine it again as you read its description from your book. Use a lens when necessary to examine structure, and if a chemical test be required, apply it, and repeat the performance till you *know* it thoroughly and are familiar with each detail. If you fail, seek the solution of the difficulty, turning to your books of reference and digging out of them the information that you need. Believe me, if you work in this way you will become interested in every subject you study, and the knowledge you so gain you will probably retain, but if you set for yourself a task, saying to-day I will read so many pages on this subject and to-morrow so many on that, your interest will flag, and little of what you read will be retained. Work up one thing at a time, objectively, in the manner described, if possible, and give to it your undivided attention till you feel that it is mastered.

What I have said implies the necessity of your learning properly to use books. Some books, a few only, need to be read and re-read from first to last, but the greater number are to be used for reference only, and the sooner you acquire the habit of consulting these and rapidly extracting from them just what you need, the better progress will you make in your studies. The art of reading with the fingers, rapidly turning over the leaves and instinctively, almost, lighting upon the fact sought, is a knack which most students can acquire and which all ought to cultivate. "The art of reading," says Hamerton in his "Intellectual Life," "is to skip judiciously. Whole libraries may be skipped in these days when we have the results of them in our modern culture, without going over the ground again. And even of the books we decide to read there are almost always large portions which do not concern us and which we are sure to forget the day after we have read them. The art is to skip all that does not concern us, whilst missing nothing that we really need. No external guidance can teach us this, for nobody but ourselves can guess what the needs of our intellect may be. But let us select with decisive firmness independently of other people's advice, independently of the authority of custom." In buying books of reference let me advise you always to look for the index, and, other things being equal, to select those which have the fullest and best. The indices in our two dispensatories are so full as to be almost concordances, and they save us much

time in hunting sometimes for very smalll needles in these great hay-stacks. Many English books have a table of contents, but no index.

One habit which it is very necessary for you to acquire is accuracy. Strive to be exact in all you do and say and write. This characteristic should be possessed by all educated persons, but it is especially necessary for you. Strive to acquire it. When looking up any fact, make sure you have obtained the information you sought; keep written memoranda of all things necessary; read over carefully everything you write before parting with it; keep all articles labelled fully and precisely; read the labels on all bottles again after using and before you replace them; check off each article that enters into a prescription as you use it, and revise the whole before you dispense it; count over all weights as you take them off the scale pan, and in all things be accurate and precise. A single error on your part may ruin your reputation—perhaps destroy a life.

Be accurate in deed not only, but in speech as well. Avoid careless and exaggerated statements; the repetition of things on mere hearsay and the hasty expression of opinions. Be accurate, precise, punctual in all you do, and no less cautious in all you say. These qualities will assuredly stand you in good stead.

The subject of food and drug adulteration is one which should receive a share of your attention. Fortunately many such adulterations are comparatively harmless, consisting in the addition of diluents or make-weights or in the coloring or manipulation of an article, by which it is made to appear better than it really is, more frequently than in the employment of deleterious or positively harmful constituents, though in the case of drugs, if such sophistication reduces the strength of the article, much harm may be done. Competition and better methods in trade have of late resulted in a great improvement in the quality of the crude drugs as sold in the market and the sale of inferior, damaged or falsified articles is by no means as common as it was a few years ago, so that in dealing with respectable houses you may feel tolerably certain of being supplied with good goods. The same is true of manufactured chemicals, and if you are informed as to the different grades and do not look always for the cheapest, you run little risk of being imposed upon. You ought not, however, in all cases to accept implicitly the seller's guarantee, but should familiarize yourselves with the physical properties and recognized tests by which strength and purity

may be determined and apply these whenever you believe it necessary, but in such work be very cautious, as most processes for assaying drugs are difficult, and nearly all the tests for purity require considerable skill in their application. Avoid slip-shod work and hasty conclusions thereform. Concerning the adulteration of foods, while it is a fact that poisonous coloring matters and other harmful substances are not infrequently employed, the fraud more commonly consists in the use of make-weights or the removal of some valuable constituent. Common starches are substituted for real arrowroot; flour is added in undue quantity to mustard; all kinds of inert substances are mixed with ground spices; jams and jellies are made from the cheapest fruit obtainable and seldom from that pictured on the label; ground coffee is too largely composed of chicory; grape sugar replaces cane sugar wherever practicable, and so on to the end of the chapter. All these are frauds and should be exposed and prohibited, but they work their greatest harm to the pocket of the consumer, and we must not believe all that we read in the papers concerning the indiscriminate use of poisons in the preparation of food articles, for much of this is quite false or very greatly exaggerated.

Hard-working men are often advised to have a hobby—something quite outside their ordinary line of work—to which they may devote spare moments by way of relaxation from the routine affairs which occupy the greater portion of their time, and I think the advice is good. Your real hard worker does not care much for frivolous amusements. They do not as a rule interest or even amuse him, but he can find real relief in some occupation which, while it calls for thought, does so in a new direction. In this way his mind unbends; the ordinary labor is thrown aside, and that which entertains him, and is at the same time not unprofitable, he pursues with pleasure, for a really busy man does not like to feel that he is wasting time. The number of hobbies is almost without limit. There is microscopy, geology or botany—indeed, almost any of the natural sciences, and especially those in which collections can be made; the gathering of coins or autographs; genealogical or local historical researches; the study of some language or literature or the works of some author. Any one of these, or other like subjects, pursued at odd times will serve not only to divert from the dull round of daily cares, but to afford much useful information as well.

And now, allow me in conclusion to express the hope that you may so pursue your studies here that when the end of the term, when the end of your course, shall come, you may look back upon the time here spent with satisfaction, feeling that no valuable time has been wasted, no opportunities neglected, no good resolutions abandoned. Restrain those inclinations which tend to draw you from the path of duty; cultivate the habit of self-control; learn to work assiduously, cheerfully, for so will you find that work is a pleasure, and resolve each day manfully to do those things which duty bids you do, however disagreeable or humble they may be, and you will find your reward in the satisfaction that comes from the sense of duty well-done, true progress made, victories achieved. Gentlemen, we bid you welcome.